20041202.0.1

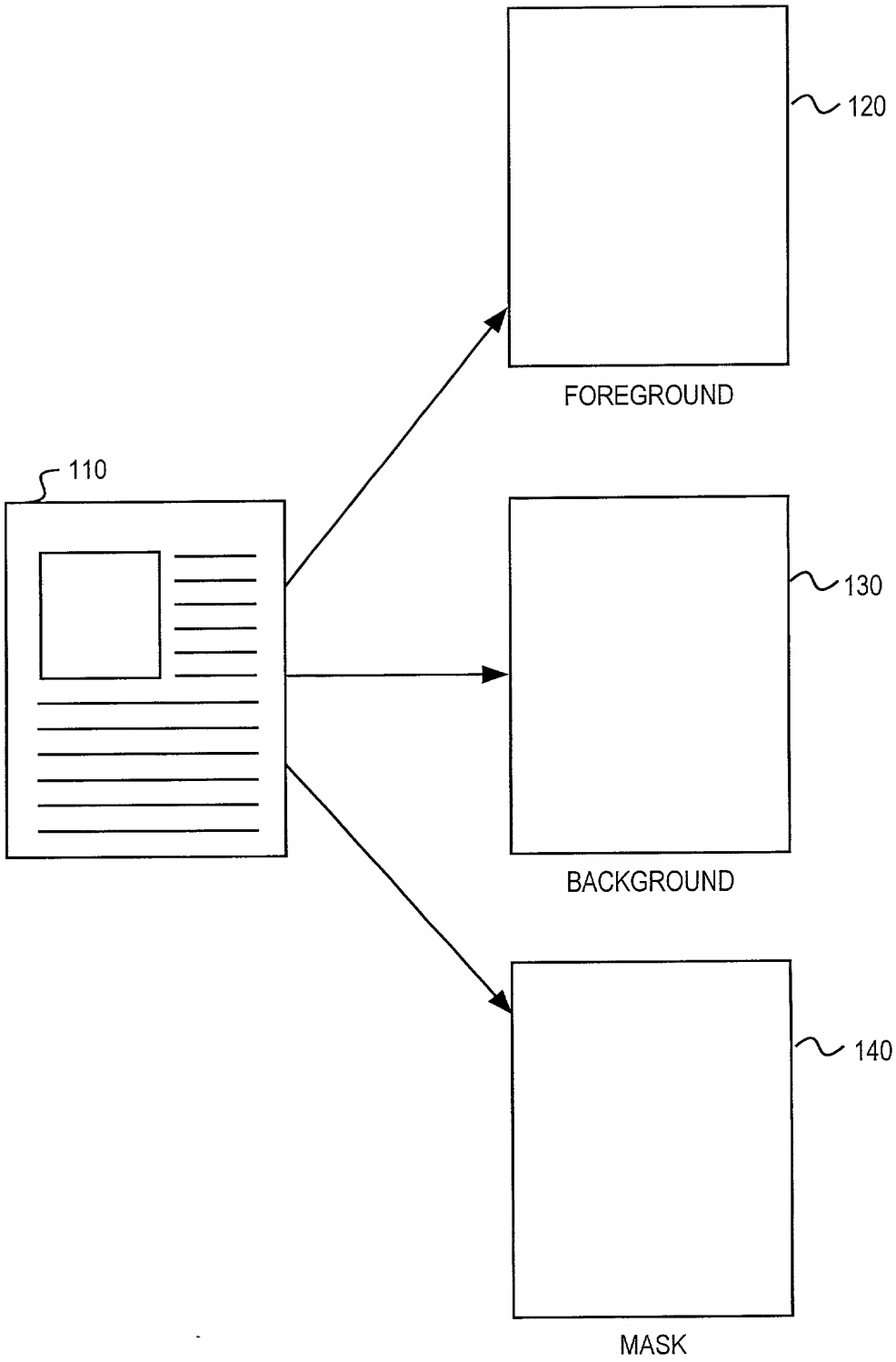

FIG. 1

20HTTP 6824007

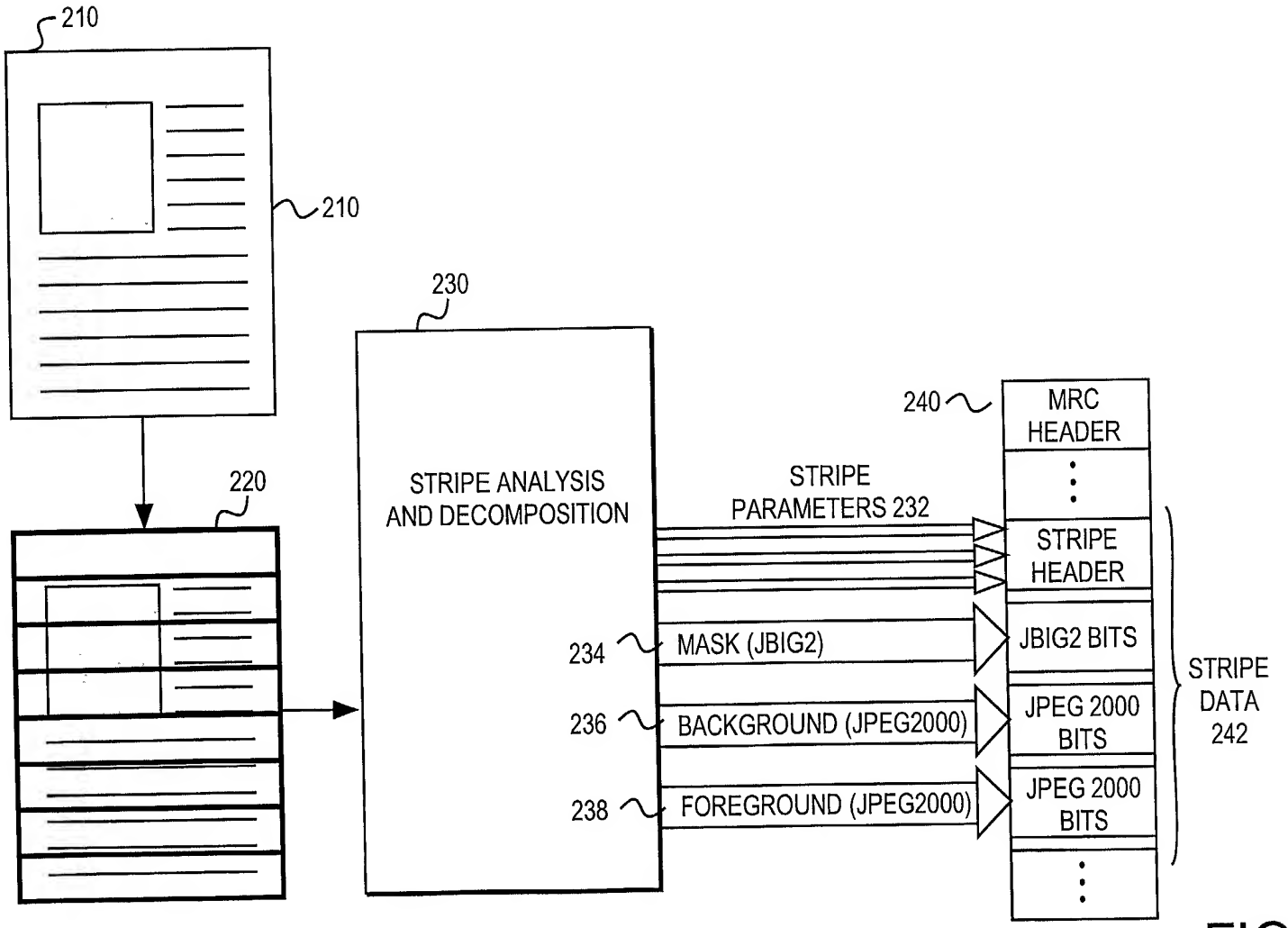

FIG. 2

Patent Application Publication

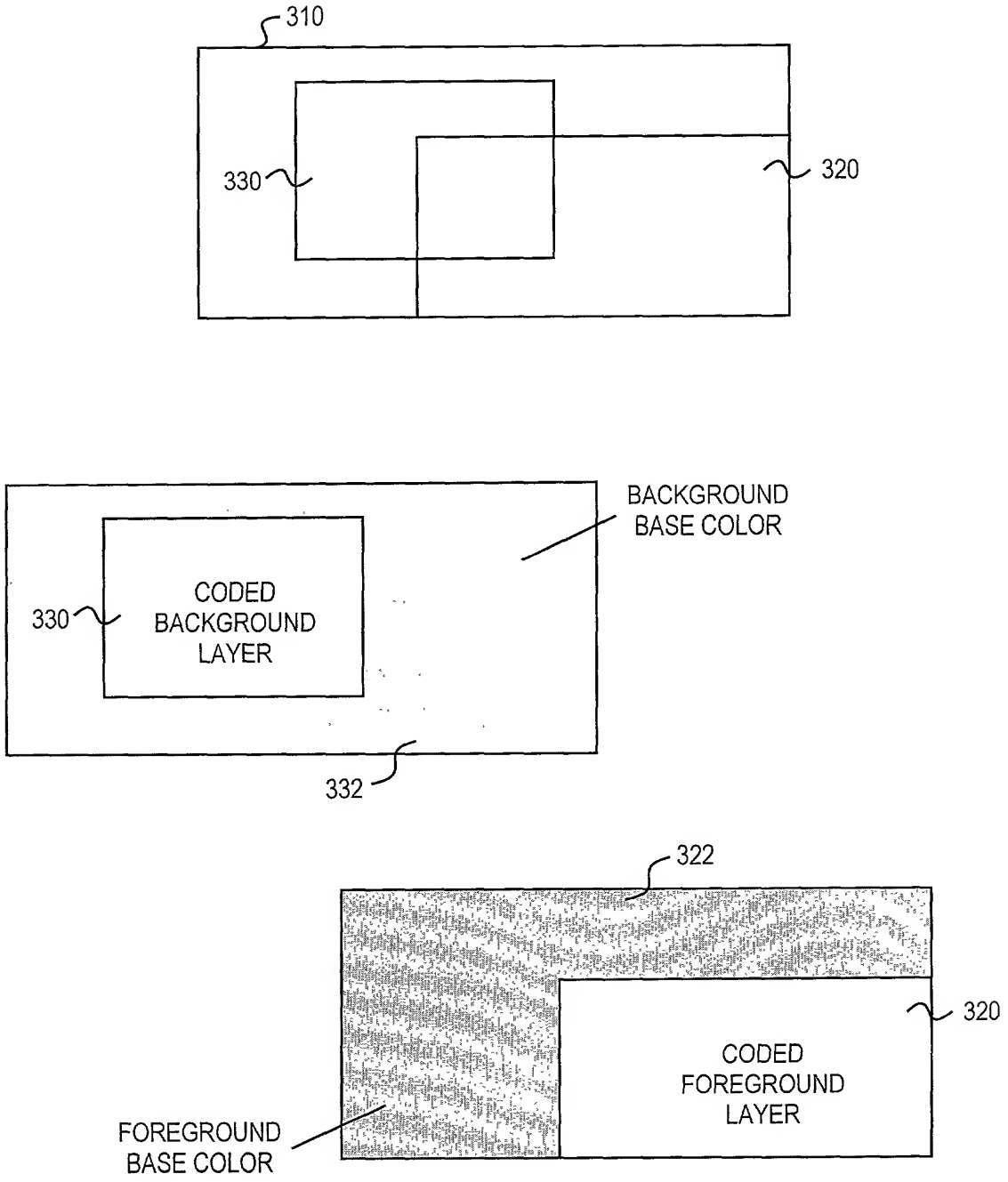

FIG. 3

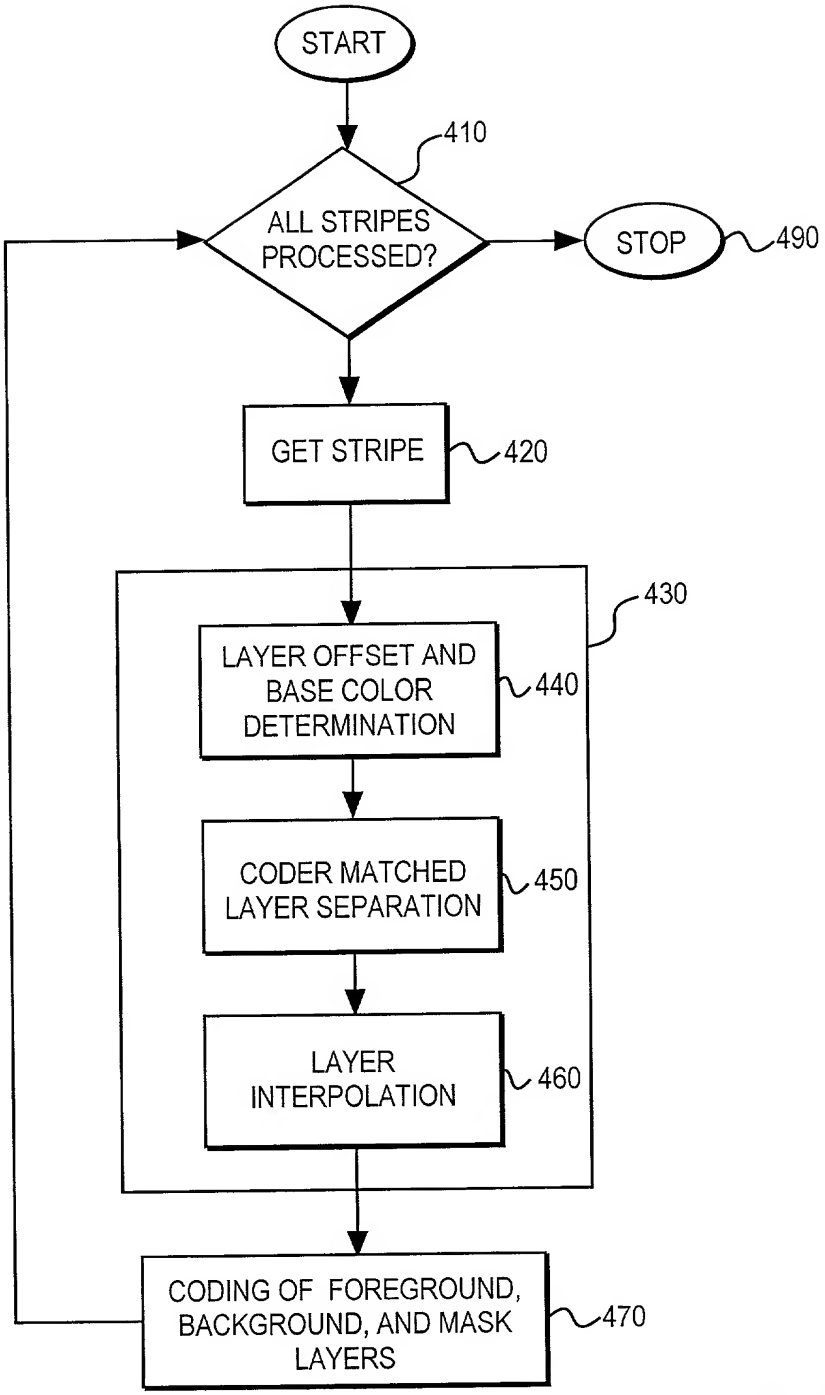
START
410
ALL STRIPES PROCESSED?
STOP
490
GET STRIPE
420
430
LAYER OFFSET AND BASE COLOR DETERMINATION
440
CODER MATCHED LAYER SEPARATION
450
LAYER INTERPOLATION
460
CODING OF FOREGROUND, BACKGROUND, AND MASK LAYERS
470

FIG. 4

20HTD 6827HOT

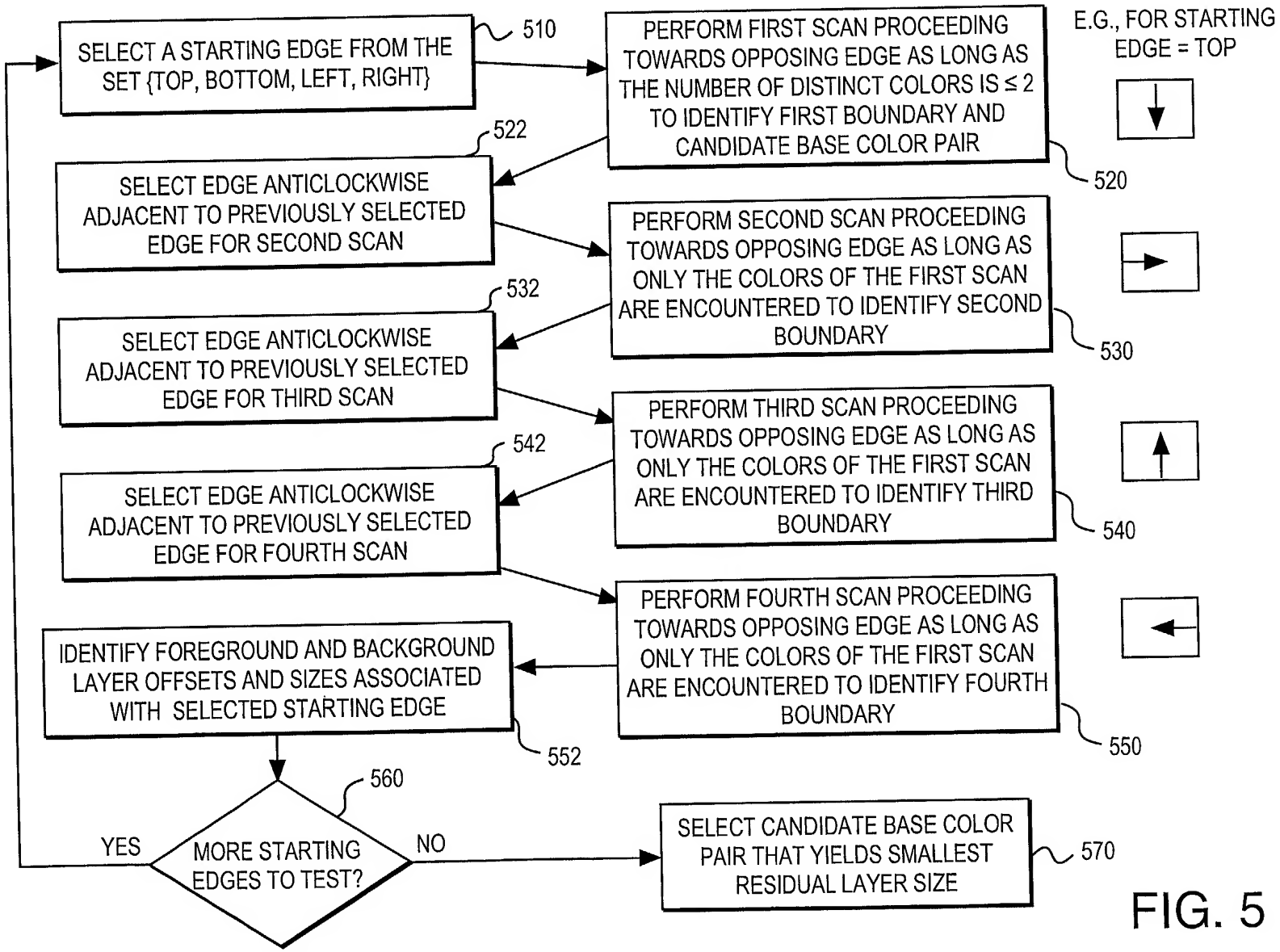

FIG. 5

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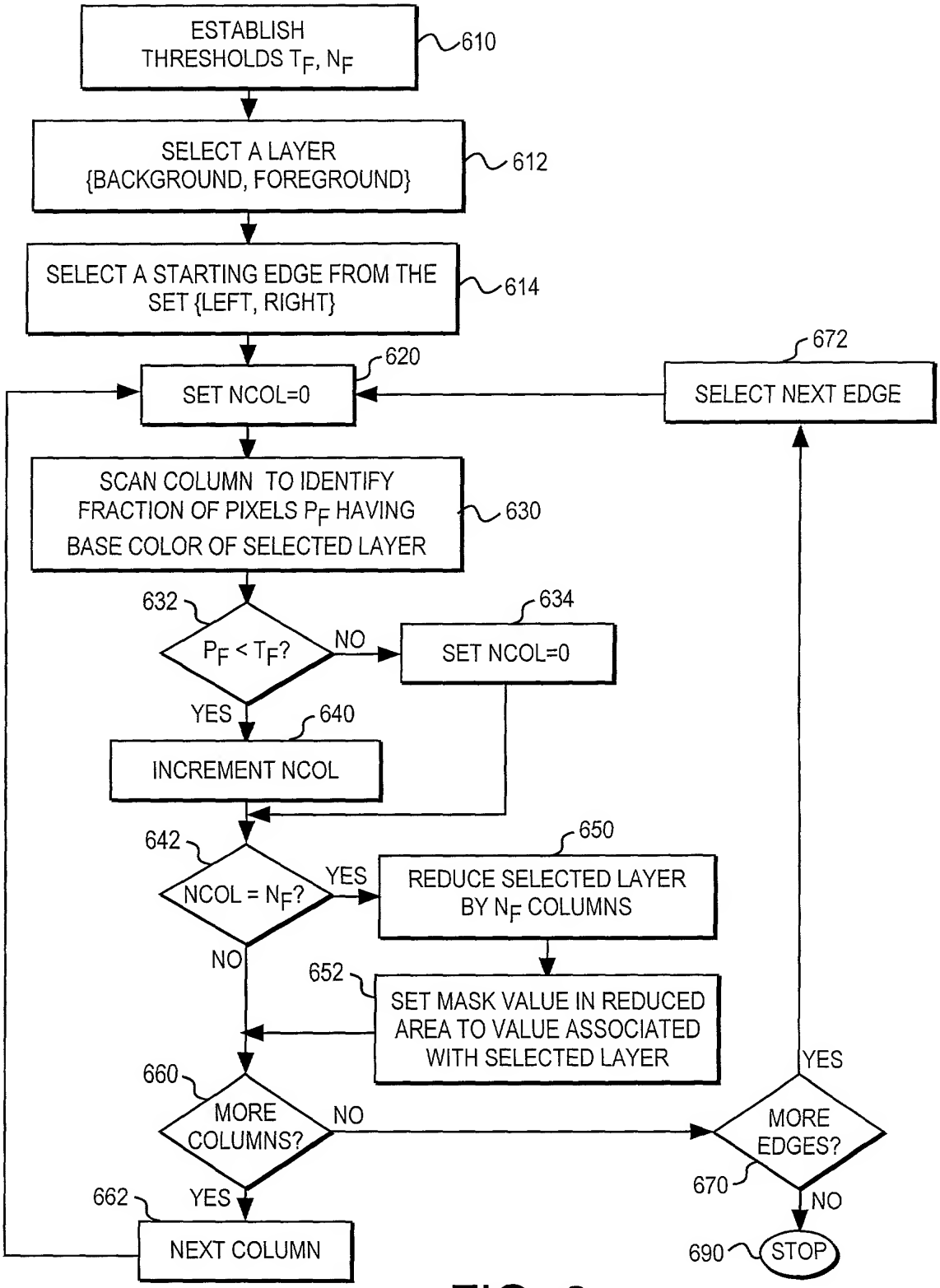

FIG. 6

Docket No. 95045.004

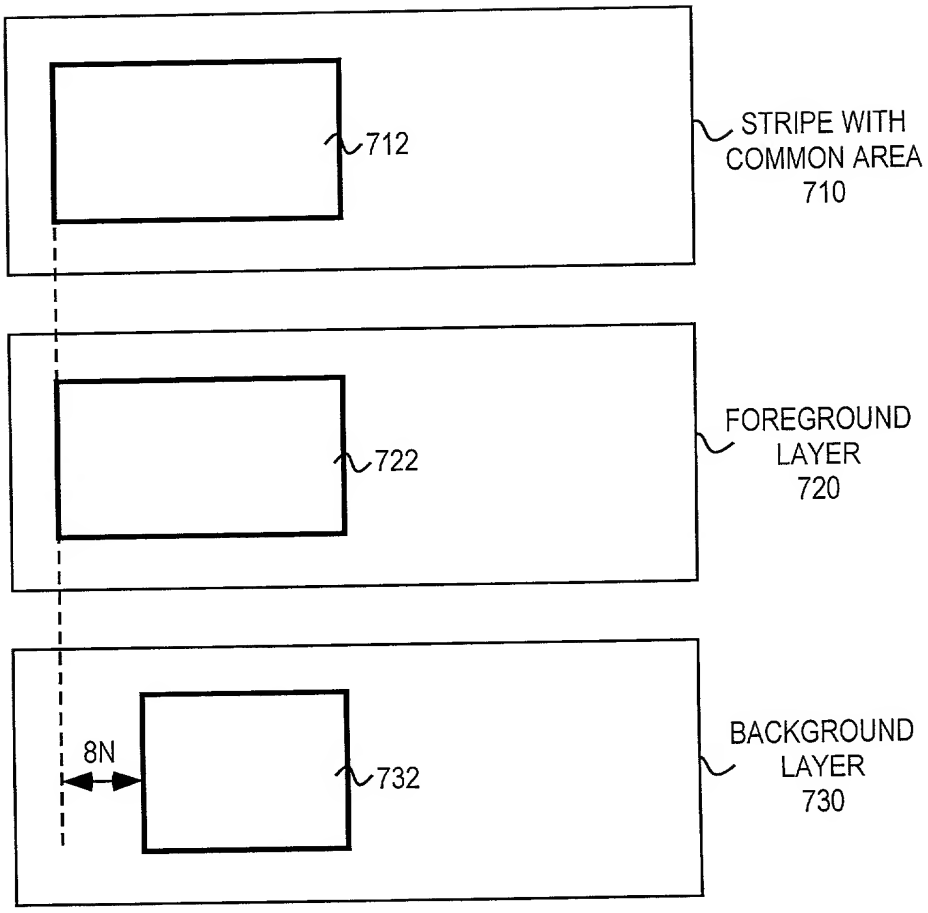

FIG. 7

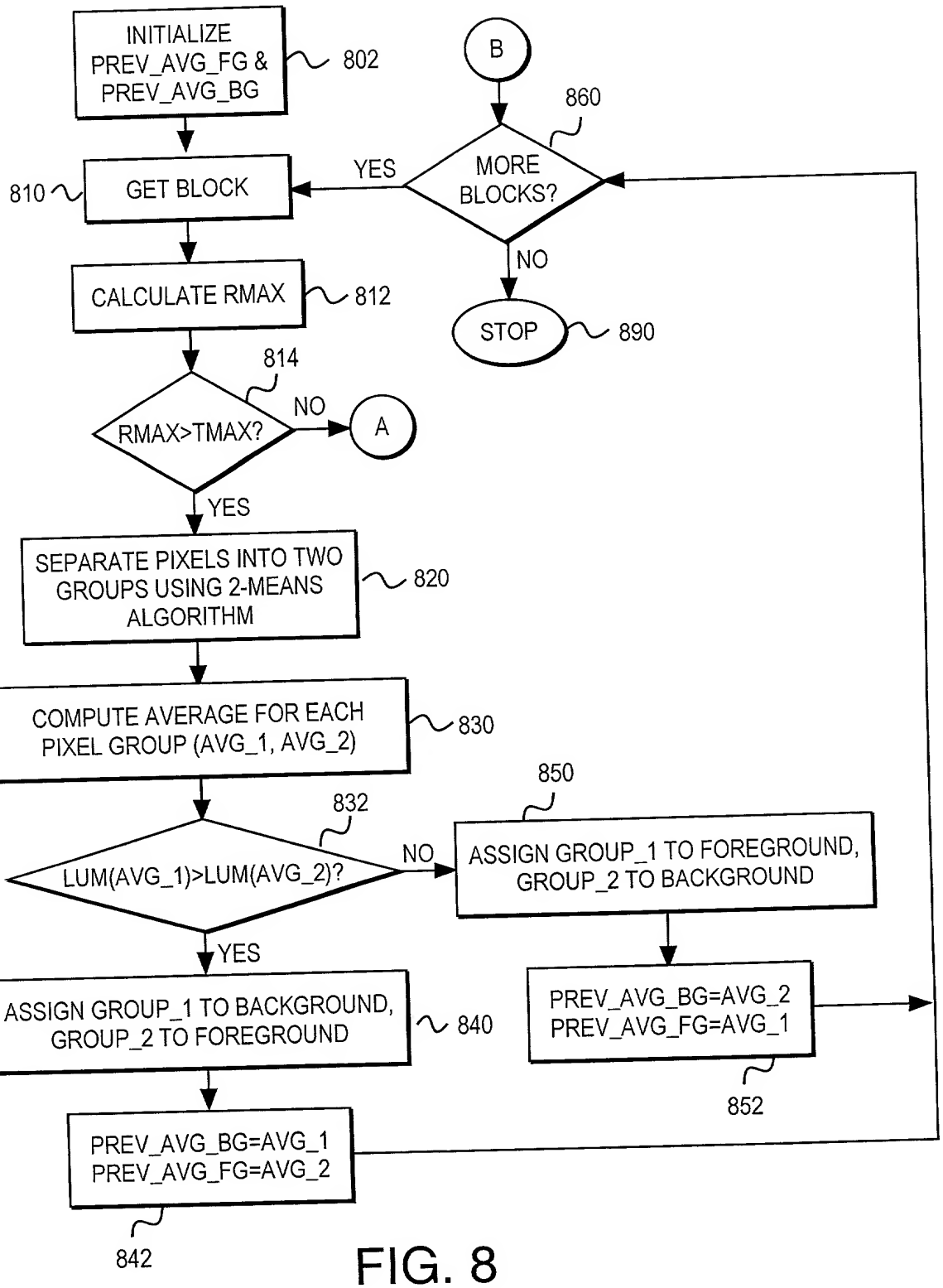
INITIALIZE PREV_AVG_FG & PREV_AVG_BG
802
B
860
MORE BLOCKS?
YES
NO
GET BLOCK
810
CALCULATE RMAX
812
STOP
890
814
RMAX>TMAX?
NO
A
YES
SEPARATE PIXELS INTO TWO GROUPS USING 2-MEANS ALGORITHM
820
COMPUTE AVERAGE FOR EACH PIXEL GROUP (AVG_1, AVG_2)
830
850
832
LUM(AVG_1)>LUM(AVG_2)?
NO
ASSIGN GROUP_1 TO FOREGROUND, GROUP_2 TO BACKGROUND
YES
ASSIGN GROUP_1 TO BACKGROUND, GROUP_2 TO FOREGROUND
840
PREV_AVG_BG=AVG_2
PREV_AVG_FG=AVG_1
852
PREV_AVG_BG=AVG_1
PREV_AVG_FG=AVG_2
842

FIG. 8

20040264.6-2202

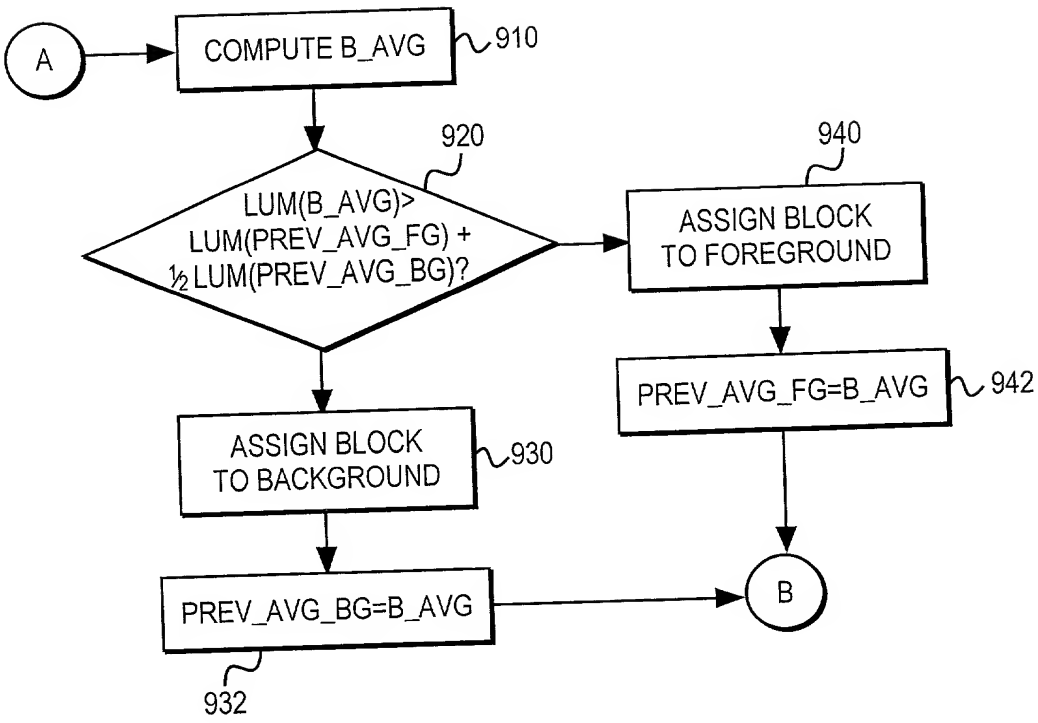

FIG. 9

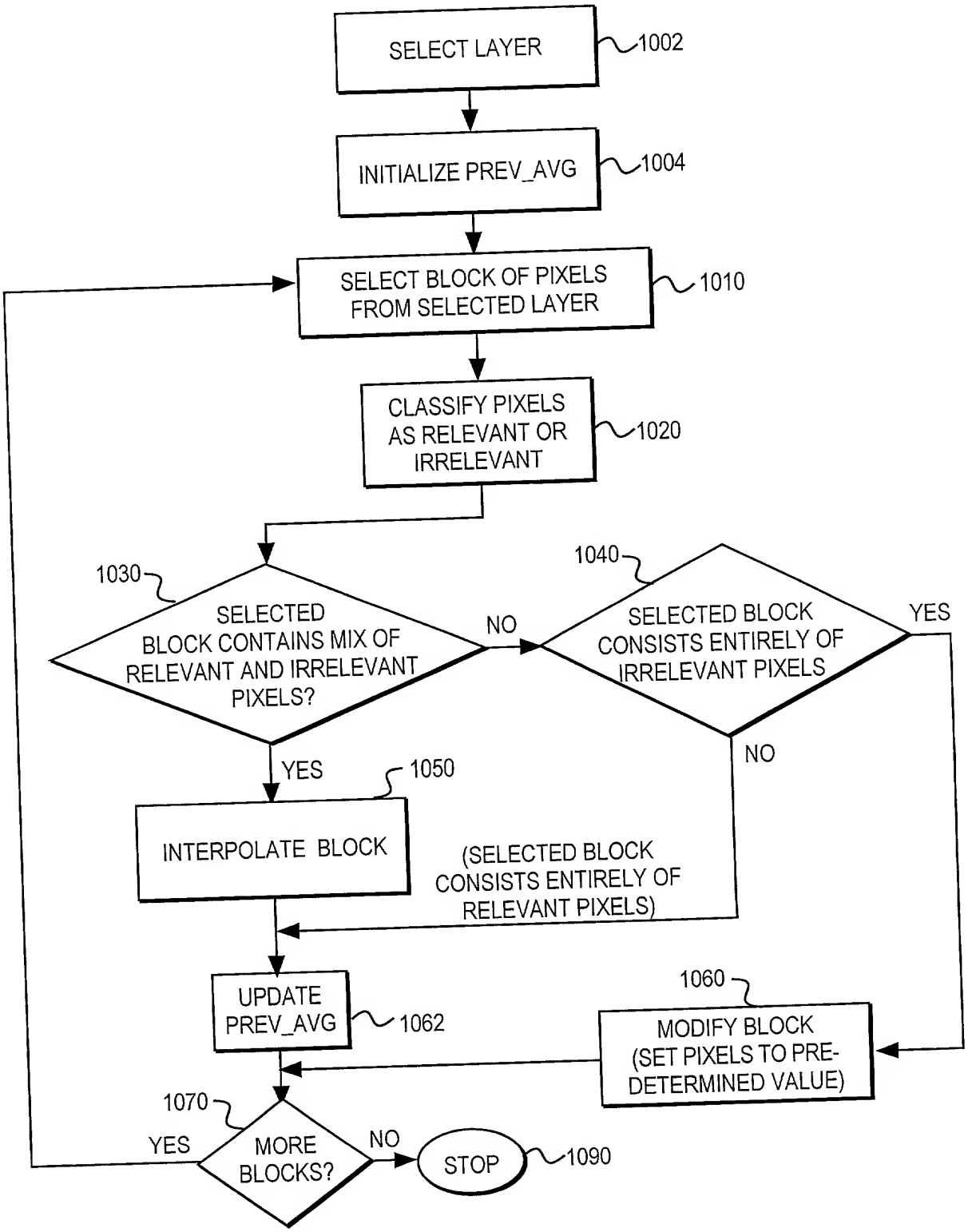
SELECT LAYER
1002
INITIALIZE PREV_AVG
1004
SELECT BLOCK OF PIXELS FROM SELECTED LAYER
1010
CLASSIFY PIXELS AS RELEVANT OR IRRELEVANT
1020
1030
SELECTED BLOCK CONTAINS MIX OF RELEVANT AND IRRELEVANT PIXELS?
NO
1040
SELECTED BLOCK CONSISTS ENTIRELY OF IRRELEVANT PIXELS
YES
YES
1050
INTERPOLATE BLOCK
NO
(SELECTED BLOCK CONSISTS ENTIRELY OF RELEVANT PIXELS)
UPDATE PREV_AVG
1062
1060
MODIFY BLOCK (SET PIXELS TO PRE-DETERMINED VALUE)
1070
YES
MORE BLOCKS?
NO
STOP
1090

FIG. 10

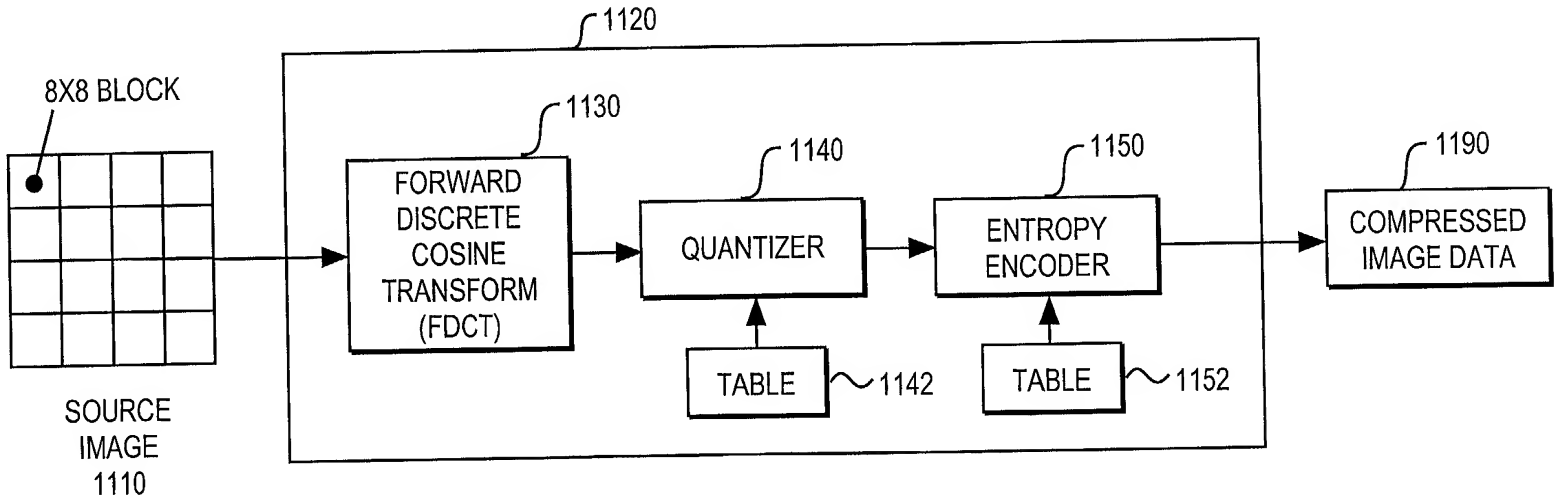
1120
8X8 BLOCK
1130
FORWARD DISCRETE COSINE TRANSFORM (FDCT)
1140
QUANTIZER
1150
ENTROPY ENCODER
1190
COMPRESSED IMAGE DATA
TABLE
1142
TABLE
1152
SOURCE IMAGE 1110

FIG. 11

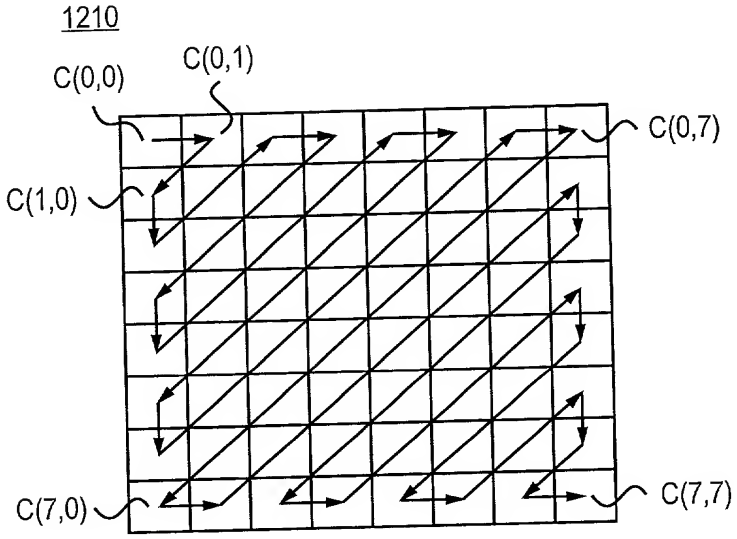

FIG. 12

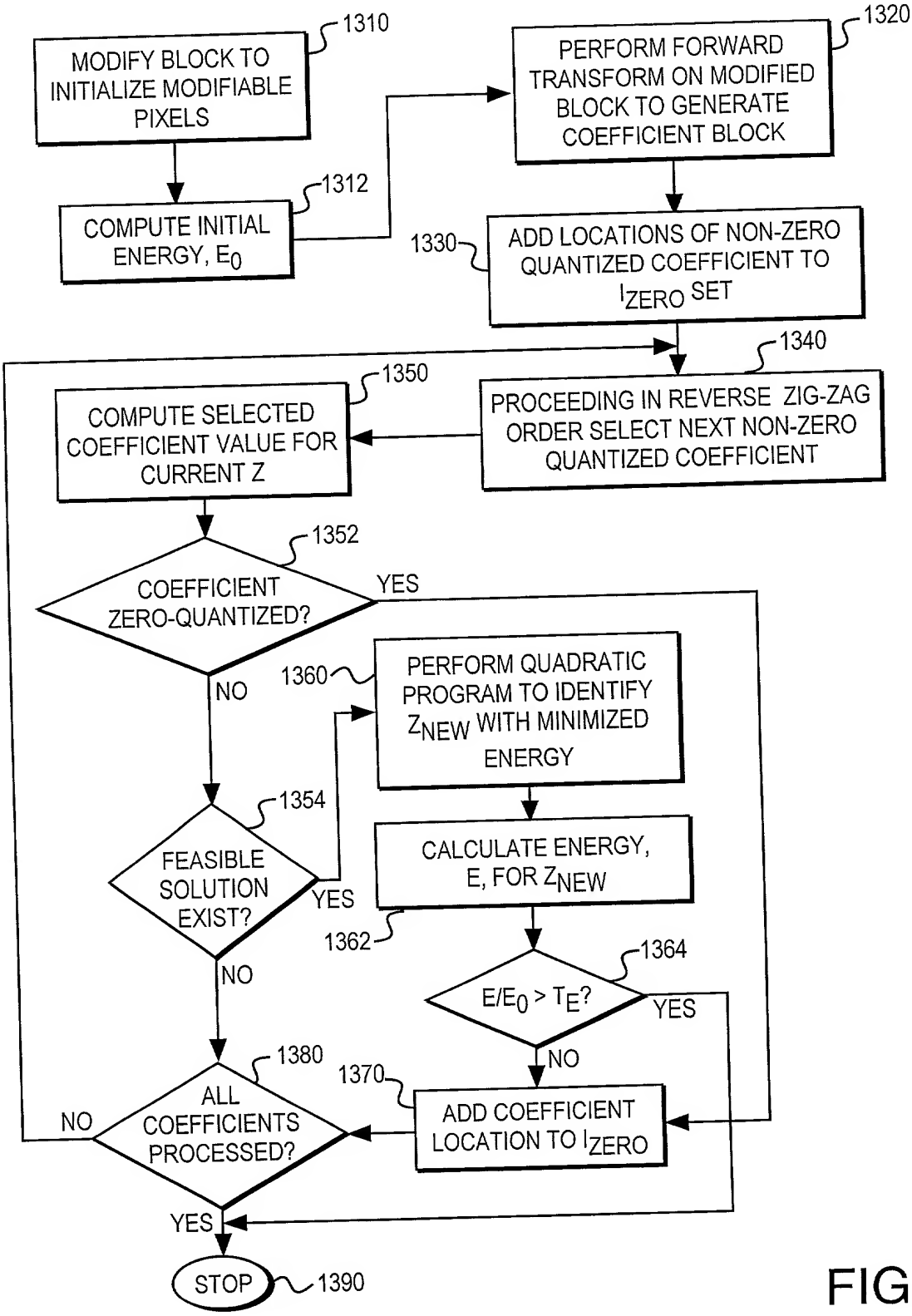
MODIFY BLOCK TO INITIALIZE MODIFIABLE PIXELS
1310
COMPUTE INITIAL ENERGY, E_0
1312
PERFORM FORWARD TRANSFORM ON MODIFIED BLOCK TO GENERATE COEFFICIENT BLOCK
1320
ADD LOCATIONS OF NON-ZERO QUANTIZED COEFFICIENT TO I_{ZERO} SET
1330
PROCEEDING IN REVERSE ZIG-ZAG ORDER SELECT NEXT NON-ZERO QUANTIZED COEFFICIENT
1340
COMPUTE SELECTED COEFFICIENT VALUE FOR CURRENT Z
1350
COEFFICIENT ZERO-QUANTIZED?
1352
YES
NO
PERFORM QUADRATIC PROGRAM TO IDENTIFY Z_{NEW} WITH MINIMIZED ENERGY
1360
FEASIBLE SOLUTION EXIST?
1354
YES
NO
CALCULATE ENERGY, E, FOR Z_{NEW}
1362
$E/E_0 > T_E$?
1364
YES
NO
ALL COEFFICIENTS PROCESSED?
1380
NO
YES
ADD COEFFICIENT LOCATION TO I_{ZERO}
1370
STOP
1390

FIG. 13

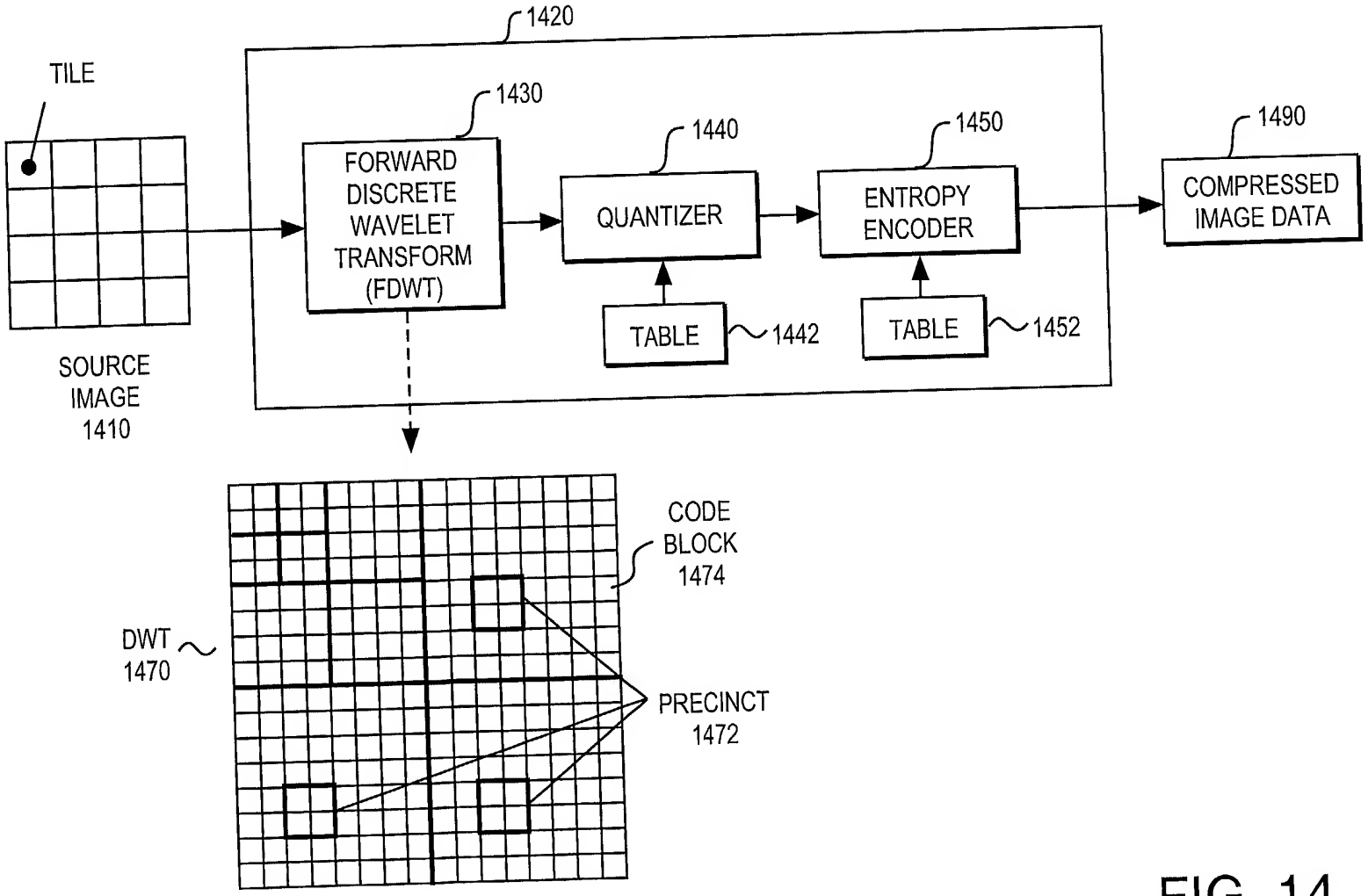
1420
TILE
1430
FORWARD DISCRETE WAVELET TRANSFORM (FDWT)
1440
QUANTIZER
1450
ENTROPY ENCODER
1490
COMPRESSED IMAGE DATA
TABLE
1442
TABLE
1452
SOURCE IMAGE 1410
CODE BLOCK 1474
DWT 1470
PRECINCT 1472

FIG. 14

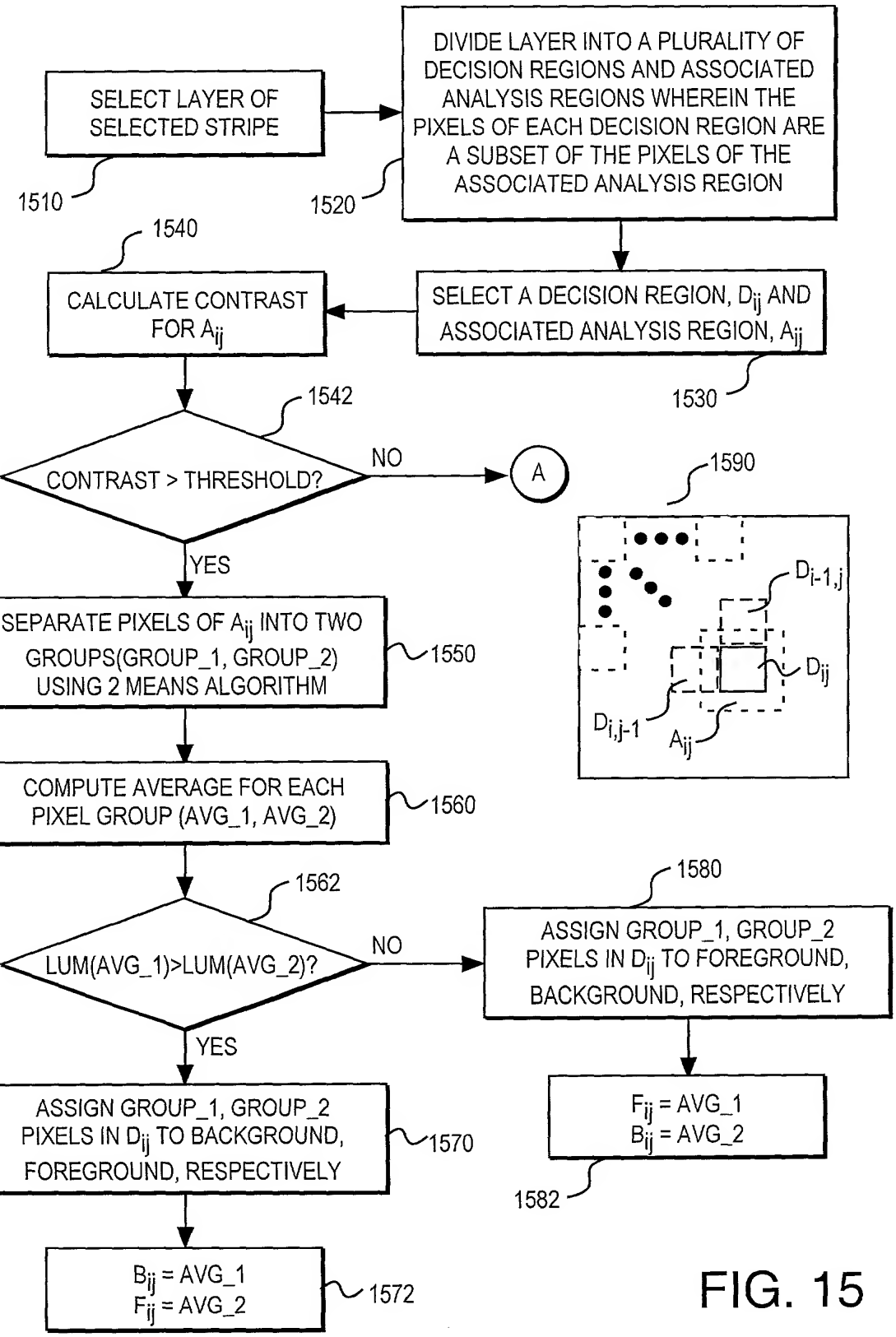
SELECT LAYER OF SELECTED STRIPE
1510
DIVIDE LAYER INTO A PLURALITY OF DECISION REGIONS AND ASSOCIATED ANALYSIS REGIONS WHEREIN THE PIXELS OF EACH DECISION REGION ARE A SUBSET OF THE PIXELS OF THE ASSOCIATED ANALYSIS REGION
1520
SELECT A DECISION REGION, D_{ij} AND ASSOCIATED ANALYSIS REGION, A_{ij}
1530
CALCULATE CONTRAST FOR A_{ij}
1540
CONTRAST > THRESHOLD?
1542
NO
A
YES
SEPARATE PIXELS OF A_{ij} INTO TWO GROUPS(GROUP_1, GROUP_2) USING 2 MEANS ALGORITHM
1550
COMPUTE AVERAGE FOR EACH PIXEL GROUP (AVG_1, AVG_2)
1560
LUM(AVG_1)>LUM(AVG_2)?
1562
NO
YES
ASSIGN GROUP_1, GROUP_2 PIXELS IN D_{ij} TO BACKGROUND, FOREGROUND, RESPECTIVELY
1570
B_{ij} = AVG_1
F_{ij} = AVG_2
1572
ASSIGN GROUP_1, GROUP_2 PIXELS IN D_{ij} TO FOREGROUND, BACKGROUND, RESPECTIVELY
1580
F_{ij} = AVG_1
B_{ij} = AVG_2
1582
1590
$D_{i-1,j}$
D_{ij}
$D_{i,j-1}$
A_{ij}

FIG. 15

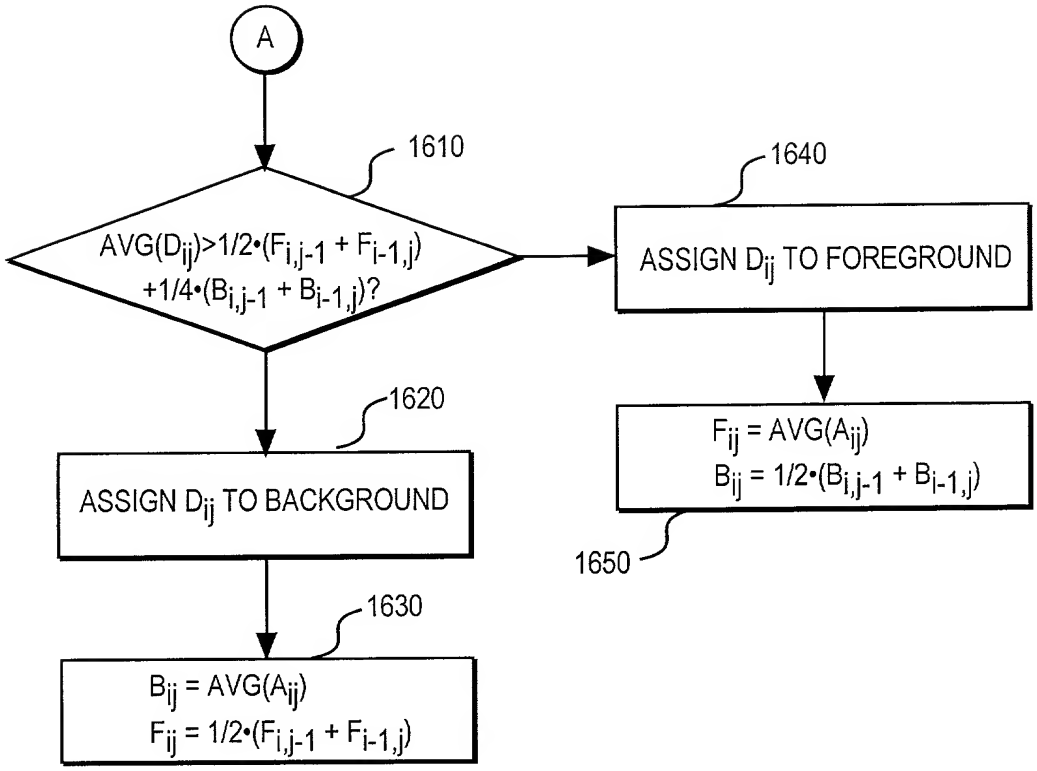
A
1610
AVG(Dij)>1/2•(Fi,j-1 + Fi-1,j)
+1/4•(Bi,j-1 + Bi-1,j)?
1640
ASSIGN Dij TO FOREGROUND
Fij = AVG(Aij)
Bij = 1/2•(Bi,j-1 + Bi-1,j)
1650
1620
ASSIGN Dij TO BACKGROUND
1630
Bij = AVG(Aij)
Fij = 1/2•(Fi,j-1 + Fi-1,j)

FIG. 16

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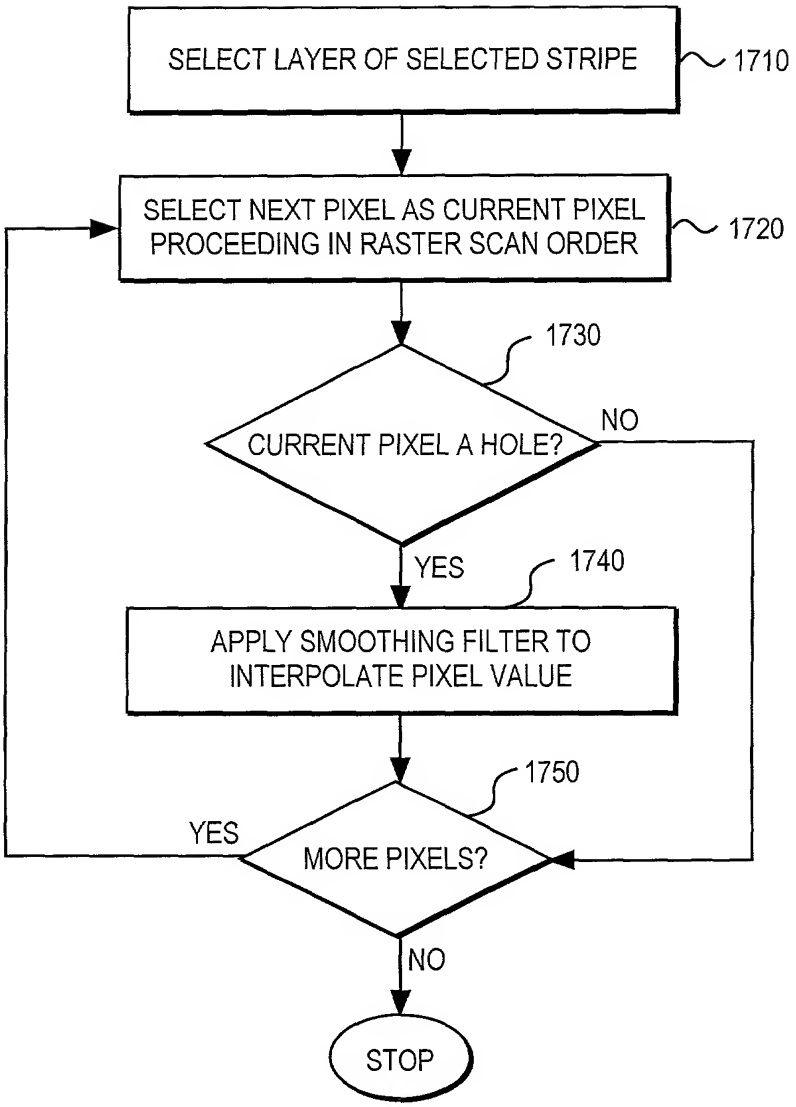

FIG. 17

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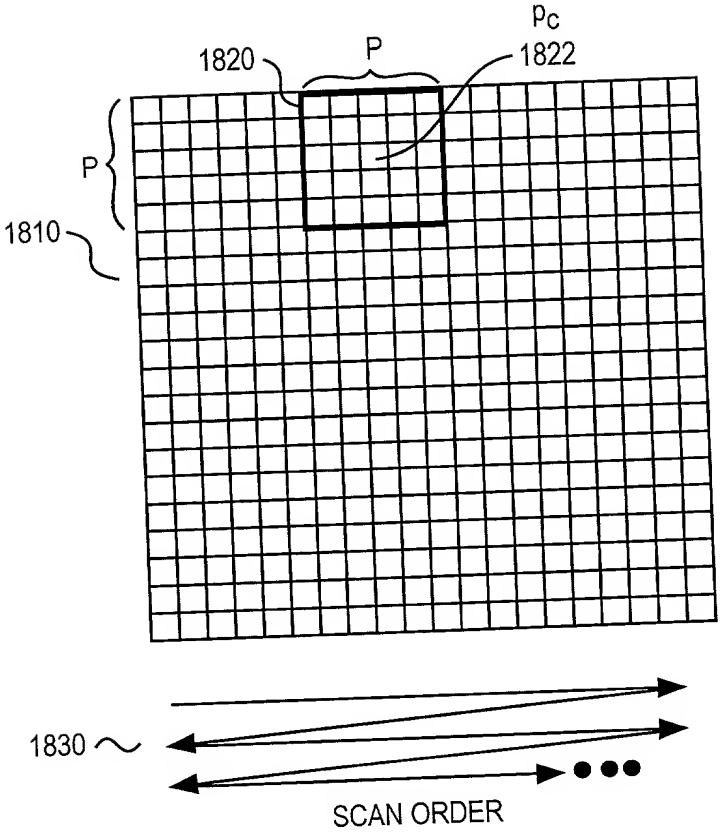

FIG. 18